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MONTHLY WEATHER REVIEW,

JANUARY, 1874.

✓ U. S. WAR DEPARTMENT,

Office of the Chief Signal Officer,

DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

A general summary of the Meteorological Observations taken under the direction of the Signal Service during the month of January, 1874, is presented in the accompanying Charts and Tables.

In reviewing the meteorological condition therein indicated, the most noticeable feature is the excess of mean temperature throughout almost the entire country over that of the corresponding period in previous years, the most marked difference being between the mean temperature of January, 1873, and that of January, 1874.

This average temperature in the several districts, together with the excess, may be found by reference to the table accompanying Chart No. 2, where it will be seen that the excess is greatest near the region of mean low barometer, apparently central over Lower Canada. The area of mean high barometer being central off the South Atlantic coast, the prevailing winds to the west of it were therefore southerly bearing the aqueous vapor from the Gulf of Mexico and Atlantic coast toward the region of low barometer. An excessive humidity in the atmosphere was therefore produced over the greater portion of the United States east of the Mississippi river. The unusual supply of vapor thus diffused over the country prevented a great loss of heat by terrestrial radiation, and tended to increase the mean temperature for the month.

STORMS.

The movements of those areas of low barometer which produced a definite cyclonic condition of the atmosphere are traced on Chart No. 1, and are numbered in the order in which they occurred. Although treated of under the general title of storms, the atmospheric disturbance, in several instances, was not sufficiently violent to warrant the use of this term.

The first storm that occurred during the month is of particular interest, as it has been traced directly from the Upper Missouri valley to the Atlantic coast. This storm was preceded by gales on the Pacific coast during the 30th and 31st days of December, and the approach of the atmospheric disturbance was indicated by the rapid fall of the barometer, with heavy rain, at Portland, Oregon, and San Francisco. The southerly winds which prevailed upon the coast show that the centre of the disturbance passed to the eastward north of Vancouver's Island.

The midnight report of January 1st announced an area of low barometer in the Upper Missouri valley, as noted on the Chart. From this point the direction of the storm was

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southeastward, following the course of the Missouri river as far south as latitude 45° ; after which its general course was eastward over the mean latitude of 47° . It was accompanied by rain and snow from the Mississippi river to the Atlantic coast, north of the Ohio valley, from the 2d to the 4th of the month. As this area of disturbance passed to the eastward, its velocity increased with a gradual rise of the barometer—conditions which do not usually obtain in storms in this latitude.

It was followed by decidedly cold weather, first in the Northwest and a "Norther" on the coast of Texas, the temperature at Fort Gibson falling from 73° to 15° , and the barometer rising 0.9 of an inch during the night of the 3d. This "Norther" continued, with snow and freezing weather, until the 6th.

II. This storm was first defined in the Gulf of Mexico, its approach being indicated by the general direction of the isothermal lines in the Southern States.

It appears to have had an equatorial origin and to have described the northern half of its parabolic track within the limits of our observation. The general course of the centre of disturbance was parallel to the coast line, and the region of precipitation extended from the Atlantic coast to the Mississippi valley, and from the Gulf to British America. It was this storm which produced the snow and sleet in the Lake region and Ohio valley on the 6th and 7th of the month, and severed the telegraphic communication between the east and west. The form of the area of least pressure during the 7th of the month, and while the storm was passing from North Carolina to Western Pennsylvania, was that of an ellipse with the major axis in the direction of progression. This feature is noted, for the reason that several attempts have been made to show that these storms are *always* elliptical in form, and that the major axis is *always* perpendicular to the course of the storm, whereas, in the present instance, the centre of depression became circular in form as it passed into the St. Lawrence valley, from which region it passed to the northeast over the mean line of atmospheric progression for the eastern portion of the United States.

III. Passed to the north of the United States, and was at no time wholly within the limits of our observation. The centre of depression was approximately marked on each of the tri-daily reports from the afternoon of the 8th to the morning of the 11th, during which time the southern half of this disturbance extended as far south as the Ohio valley and the Middle States, producing rain or snow in these regions and the Northeast.

IV. Originated in the Mississippi valley, and was first marked as central in Missouri on the morning of the 13th. It moved to the eastward with a mean velocity of 50 miles per hour without producing high winds, except on the eastern coast.

During the 15th and 16th of the month a severe storm prevailed on the Pacific coast, extending from central California to the west coast of British America, and the barometer fell to the unusual reading of 29.06 inches at Portland, Oregon.

Reports received from vessels in the Pacific previous to the above dates indicate that this storm existed as a severe northerly gale in latitude $30^{\circ} 18' N.$, longitude $145^{\circ} W.$, January 13th, and as a northeasterly gale in latitude $37^{\circ} 15' N.$, longitude $156^{\circ} 26' W.$, on January 14th, when the barometer fell to 29.46 inches. This storm is not traced upon the chart, because it passed to the north of the United States without any unusual disturbance, except in the Upper Lake region and north of Minnesota, the barometer at Fort Garry falling to 29 inches, the lowest reading noted during the month.

V, VI, VII and VIII developed west of the Mississippi river and moved eastward, accompanied by rain or snow, without producing high winds, the last named presenting the unusual condition of developing and wholly disappearing within the limit of our stations, notwithstanding the atmosphere had assumed a definite cyclonic movement.

WINDS.

The mean direction of winds at the several stations is represented on Chart No. 2 by the arrows, and it will be observed is generally toward the area of low barometer.

Apart from the storms already described, no high winds were reported, except almost continuous gales at Pike's Peak. During the month of January, thirty-five Cautionary Signals were ordered on the Atlantic coast, embracing those stations between Eastport and Wilmington, and five telegraphic warnings of the approach of storms were sent to Canadian ports. Out of the whole number of signals ordered at the American ports, twenty-eight have been justified by the occurrence of dangerous winds at or within one hundred miles of the station at which the signal was ordered.

The observer at Norfolk reports that no vessel attempted to leave the port during the display of signals.

The observer at New Haven reports that the signal on the 7th attracted general attention, as it was ordered twenty-four hours before the dangerous winds occurred.

The signals ordered at Eastport were not verified by the occurrence of winds; but dense fogs prevailed rendering navigation dangerous.

TEMPERATURE.

The general distribution of temperature throughout the United States is indicated by the isothermal lines on chart No. 2.

The table will show that there has been an excess in all the districts, except Minnesota, where it has been normal. The greatest excess has been in the regions of greatest precipitation. The range of temperature has been greater than usual in the Southern States. On the precipitation chart will be found the lines marking the southern limit of snow and freezing weather. The mean temperature as calculated from the observations made at the three stations on the Pacific coast is but slightly in excess of the mean for the same period in previous years.

PRECIPITATION.

Chart No. 3 is a graphical representation of the precipitation in the several districts. The local nature of rain-fall, together with the limited number of stations, renders this Chart only approximately correct. Probably the most interesting feature is the excess of rain-fall on the Pacific coast, and its influence on the agricultural interests of that section.

A comparison of the annual wheat crop with the annual rain-fall shows that the yield has been largest in those seasons in which rains have been most abundant. The amount of rain-fall for the past six months is largely in excess of the average, and would appear to indicate a bountiful harvest for 1874.

RIVERS.

Freshets and floods have been reported in the rivers draining the Apalachian Chain, and in those of New England and the Middle States during the 8th, 9th and 10th days of the month. The Ohio river has been unusually high at Cincinnati and Louisville, but has been open during the entire month. Fluctuations, without any decided high waters, have occurred in the Mississippi and Missouri rivers. The latter has been closed during

the entire month above Leavenworth. The Mississippi river was filled with floating ice at Keokuk, from the 5th to the 13th, was closed from the 14th to the 15th. Ice disappeared on the 19th, and reappeared again on the 28th.

At St. Louis the river was closed from the 11th to the 15th, opened on the 18th and ice disappeared on the 27th.

At St. Paul it remained closed during the entire month.

Heavy freshets causing great loss of property have been reported from Buffalo.

FACTS AND METEOROLOGICAL PHENOMENA.

Meteorological observations have been continued at Pike's Peak during the month of January, the station being situated about 14,000 feet above the level of the sea. The monthly means, determined from the three daily observations taken, respectively, at 7 a. m., 2 and 9 p. m., are as follows:

Barometer, 29.80, mean.	30.16, highest.	27.32, lowest.
Temperature, 6° 1 " "	23° " "	—25° " "
Relative humidity .53.		

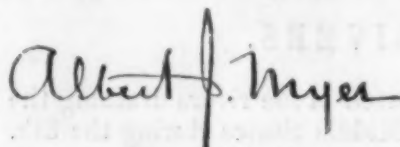
In comparing the oscillations of the barometer with the changes of temperature, it has been found that the temperature rises with an increase of pressure.

The observer reports peculiar bands of cirri at 4 p. m. on the 10th a little north of the zenith, extending from WNW to SSE, converging near the horizon and having a breadth of 5°. These remained stationary for about an hour, and were finally obscured by fine cirro-stratus clouds or haze.

Numerous auroral displays have been reported from stations north of the fortieth parallel of latitude, the time of occurrence being generally between 8 and 10 p. m. The frequency of these displays apparently depends upon the position of the station in the auroral zone. Those occurring at Boston, New York, Alpena, Duluth, and Breckenridge, between the 15th and 20th, are especially noted as peculiar and brilliant. The observer at Detroit reports evidences of the atmosphere having been charged with electricity on January 21st, the telegraphic instrument working with the batteries disconnected. The observer at Long Branch reports the appearance at 2:10, p. m., on the 4th, of a well-defined "Fog-bow" in the North. He says: "This bow was larger than the usual rainbow, and was perfectly white. It occupied the same position in the horizon that a rainbow would at that hour of the day." The observer at Boston reports that on the 15th light snow fell from a cloudless sky.

The lowest temperature reported from any station during the month was —33° at Breckenridge, Minnesota, on the 24th. The highest barometric reading telegraphically reported during the month was 30.98 inches at Pembina, D. T., January 29th, and the lowest 29.00 at Fort Garry, Manitoba, on the 17th.

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Brig. Gen. (Bot. Assg'l) Chief Signal Officer, U. S. A.

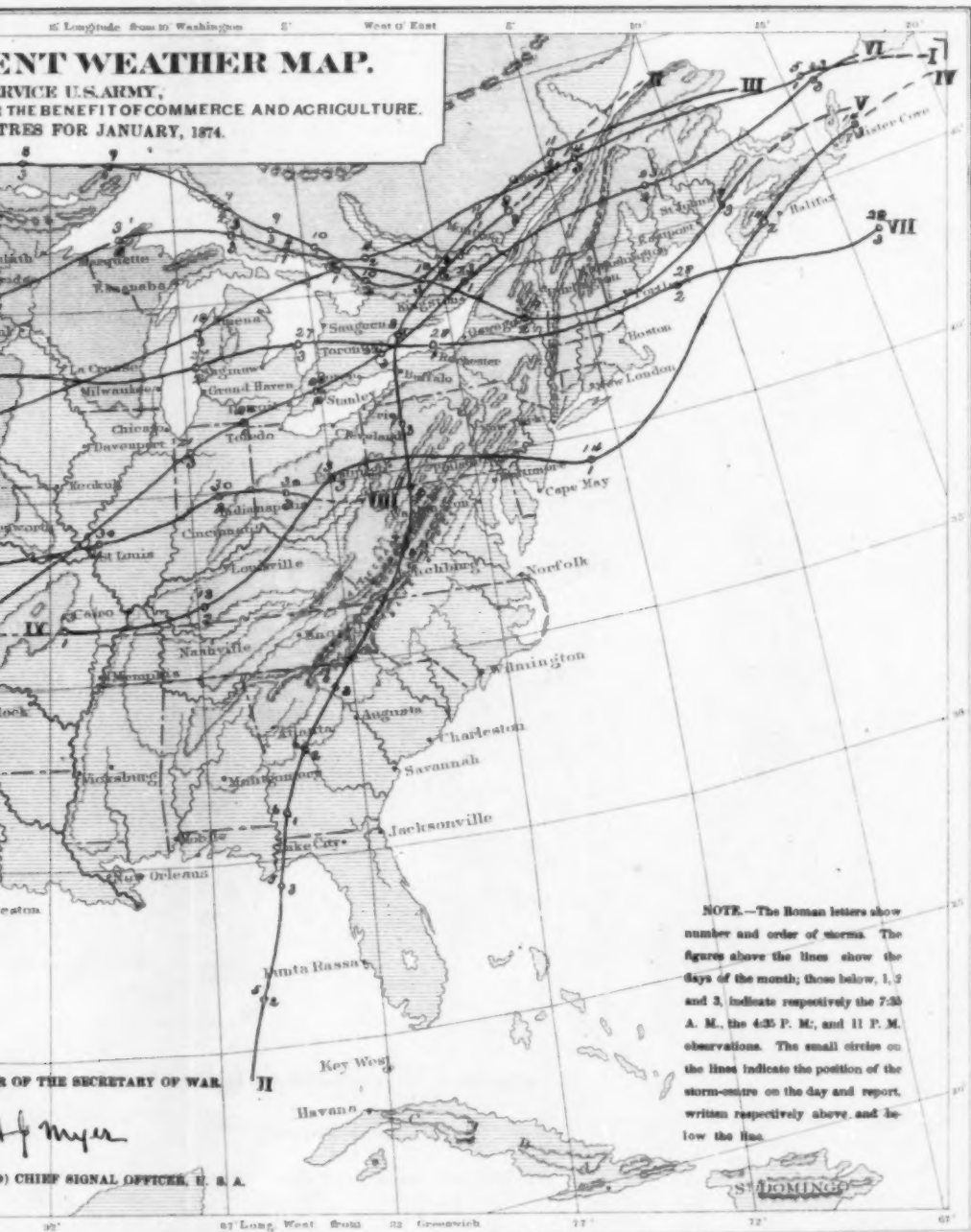
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STORM WEATHER MAP.

SERVICE U.S. ARMY,
FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.
STORMS FOR JANUARY, 1874.

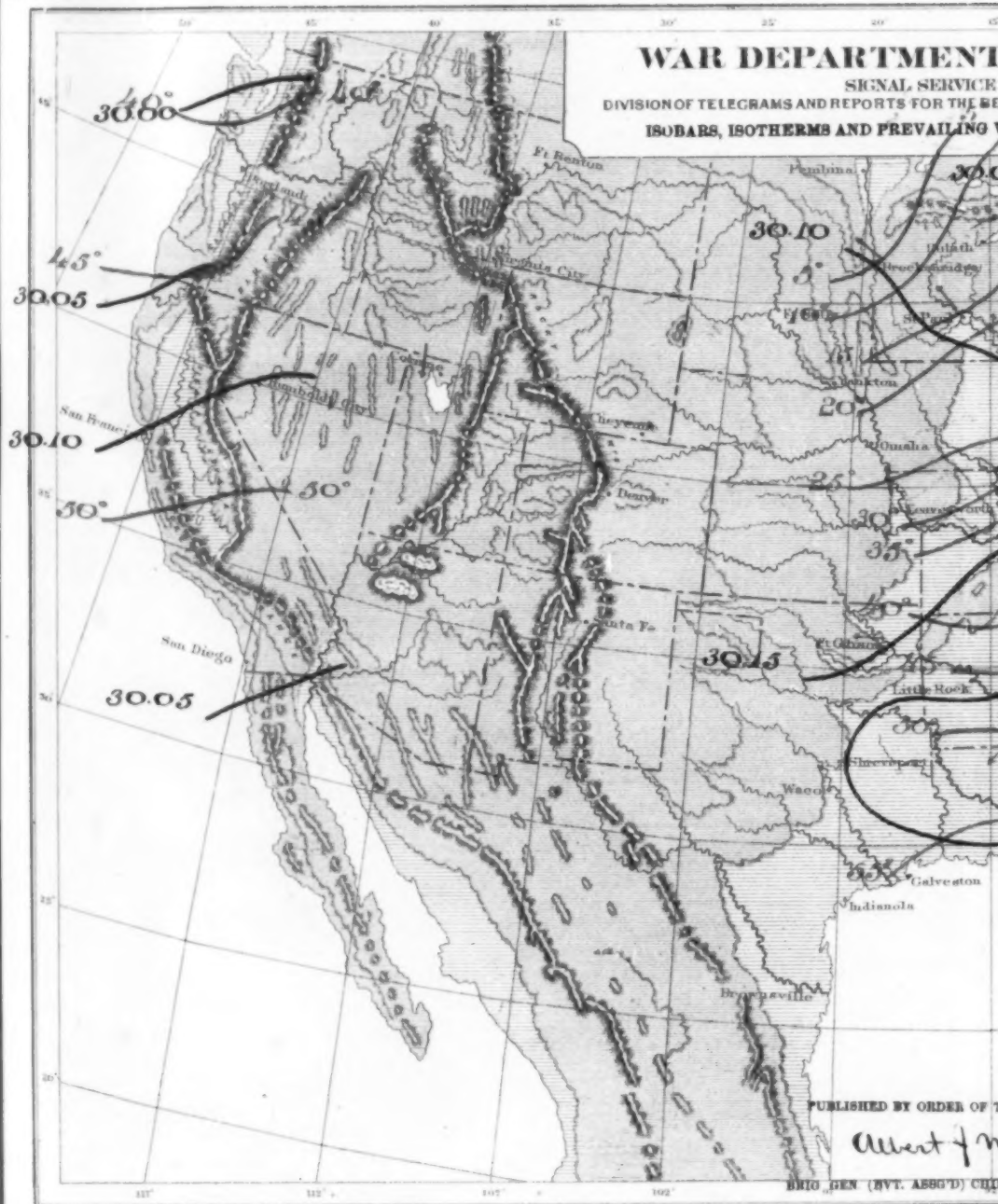


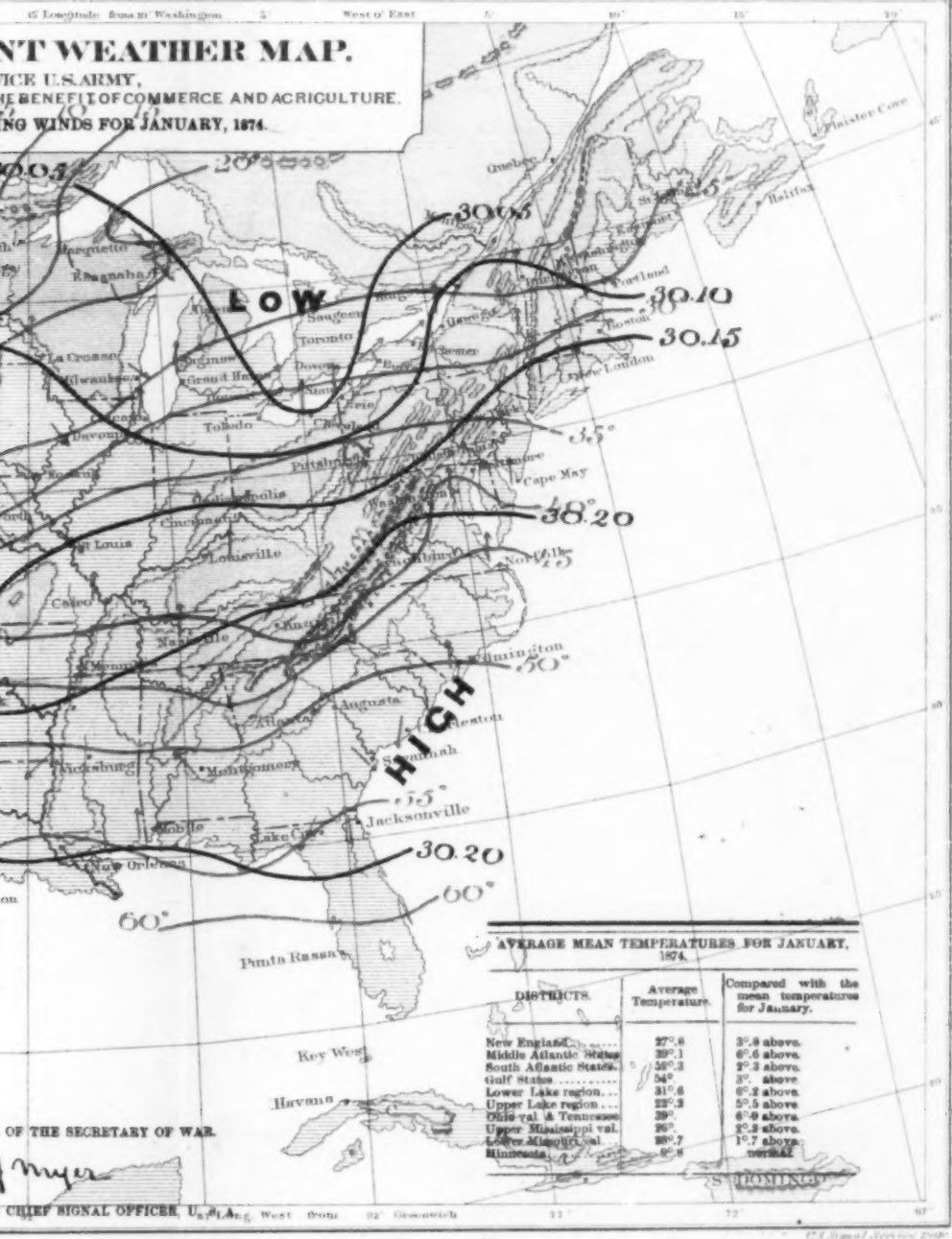
NOTE.—The Roman letters show number and order of storm. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the storm-center on the day and report, written respectively above and below the line.

OF THE SECRETARY OF WAR.

CHIEF SIGNAL OFFICER, U. S. A.

U.S. Signal Service, Wash.



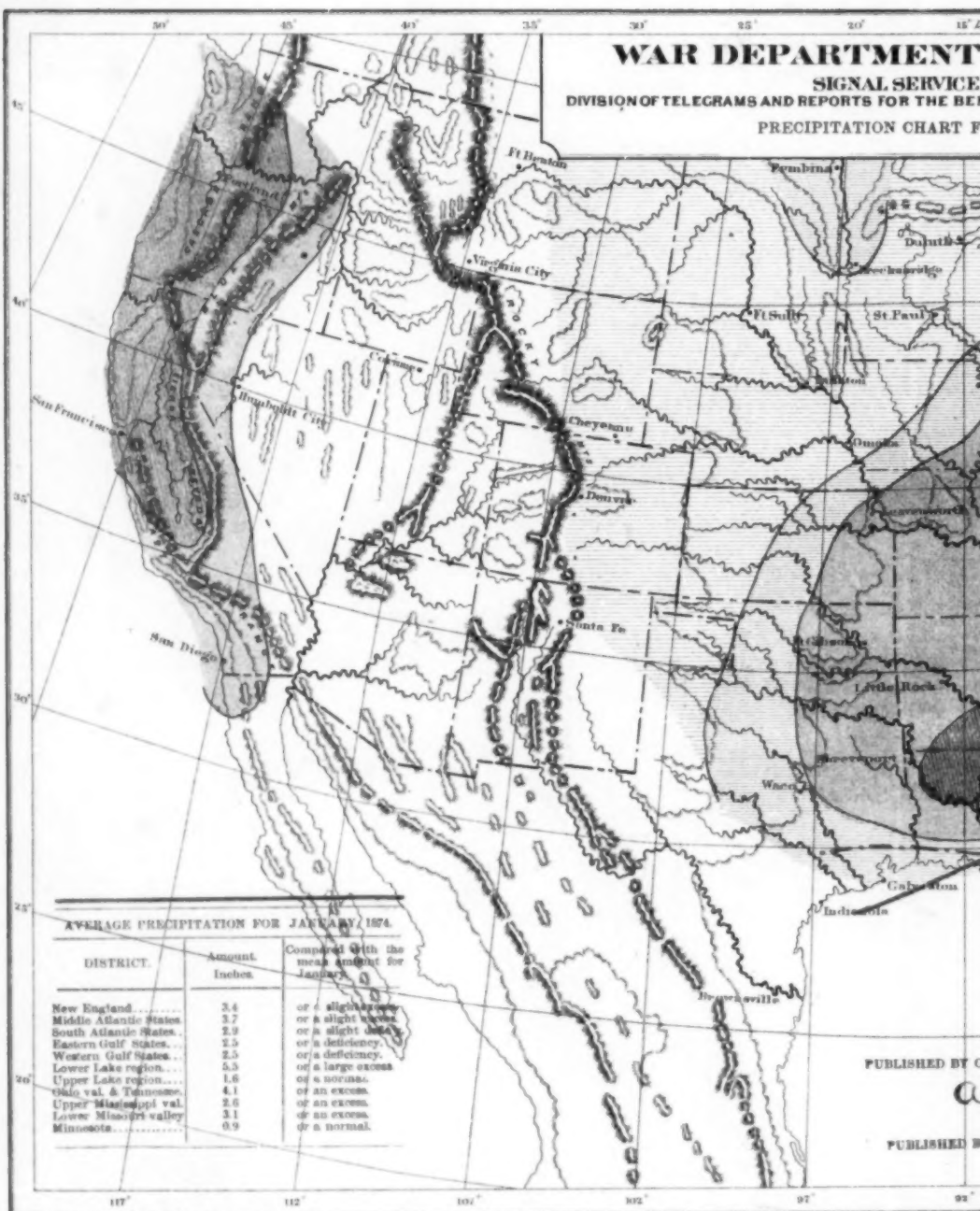


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15° Longitude from 10° Washington 0° West 0° East

ANT WEATHER MAP.
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PART FOR JANUARY, 1874.

